

CLAIMS

1. A radio frequency modulator, comprising:

5 a phase lock loop (PLL) having an input port for receiving a modulation signal and producing as an output signal a modulated RF signal at an output port;

a phase demodulator having an input port for receiving the modulated RF signal and having an output port for providing a phase information signal;

10 a comparator having a first input port for receiving the phase information signal and a second input port for receiving the modulation signal and an output port for providing an error signal; and

a pre-emphasis filter in response to receiving the error signal adjusts the modulation signal provided to the PLL.

15 2. A radio frequency modulator as defined in claim 1, wherein the pre-emphasis filter comprises a digital pre-emphasis filter.

3. A radio frequency modulator as defined in claim 1, further comprising a direct digital synthesizer (DDS) coupled between the pre-emphasis filter and the PLL.

4. A radio frequency modulator as defined in claim 1, wherein the PLL has a transfer function and the pre-emphasis filter preconditions the modulation signal with a filter response which is about the inverse of the PLL transfer function.

5 5. A radio frequency modulator as defined in claim 1, wherein the phase demodulator comprises a digital phase demodulator.

6. A radio frequency modulator as defined in claim 1, wherein the modulation signal comprises a digital modulation signal.

7. A method of producing a stable and low noise modulator, comprising the steps of:
- (a) providing a phase lock loop (PLL) for receiving a modulation signal and producing a modulated RF signal;
 - (b) demodulating the modulated RF signal to produce a demodulated signal;
 - 5 (c) comparing the demodulated signal with the modulation signal in order to provide an error signal; and
 - (d) using the error signal to precondition the modulation signal provided to the PLL using a pre-emphasis filter.
- 10 8. A method as defined in claim 7, wherein step (d) comprises preconditioning the modulation signal in the digital domain using a digital pre-emphasis filter.
9. A method as define in claim 7, wherein the PLL has a transfer function and the pre-emphasis filter has a filter response of about the inverse of the PLL transfer function.

10. A digital modulator for use in a radio frequency transmitter, comprising:

a phase-lock-loop (PLL) loop producing as an output signal a modulated RF signal;

a phase demodulator having an input port for receiving the modulated RF signal

5 and having an output port for providing a phase information signal;